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SECP1513 - Sec 04

TECHNOLOGY AND INFORMATION SYSTEM

ASSIGNMENT 3

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5G IN THE CAMPUS

5G APPLIACATION IN THE CAMPUS...

SMART CAMPUS.....

.....AND EMERGING NETWORK TECHNOLOGIES
IN A GLANCE

Picture source:https://expertfile.com/spotlight/7594/expert-available-5g-security-risks-and-benefits

5G APPLICATION IN THE CAMPUS: XR TECHNOLOGY AS TEACHING MEANS

By: Veron Woon and Chong Yaen Li

XR or Extended Technology previously need large amounts of computing power and connecting bandwidth in order to operate smoothly, but with 5G the effort may be easier.

The elements of XR: Virtual Reality (VR), Augmented Reality (AR) and Mixed Reality (MR) are gradually entering the education sector which make the class more interactive and interesting. However, these technologies are still unable to be deployed en masse due to several problems as listed below:

- **XR technologies are generally resource intensive, meaning they can get lagging or out-of-sync when there is insufficient received data for processing.**
- **The data stream (especially graphic rendering) needed for XR are complex and requires a strict processing because it needs to synchronize the hologram with real life surroundings instantaneously.**
- **Current network connections cannot catch up with the high bandwidth (25Mbps-2.35Gbps) and low latency requirements (40ms-10ms) of XR gadgets.**

5G connections fulfill all the requirements for XR technologies and was chosen to be the main contender of XR data transfer agent that brings less buffering and smoother experience to the users. This, in turn, allows more high definition graphics to be streamed seamlessly in real time as well as allowing more data stream coverage.

References:
https://www.xrtoday.com/virtual-reality/how-5g-will-accelerate-the-vr-revolution/
https://stlpartners.com/edge_computing/how-5g-and-edge-computing-will-transform-ar-vr-use-cases/

CASE STUDY

In 2021, Fisk University has launched the first VR interactive learning in the campus for the medical students. The campus have decided to form a virtual cadaver lab in order to replace plans for constructing a physical cadaver lab due to high costs and need of constant maintenance. Besides, it will also be offering several history courses with VR creations of various notable historical sites.

"Remote learning is broken and VR campuses enable professors and students to again come together to teach, learn and solve problems."
Steve Grubs,CEO of VictoryXR.

Inside the lab, students will be able to interact with the VR environment by wearing VR headsets powered by 5G network infrastructure,5G's low latency allows the perfect synchronization between VR gadgets to provide seamless real-time response for users, while its high bandwidth also allows the fast transfer of data needed for the VR software to run without lags.

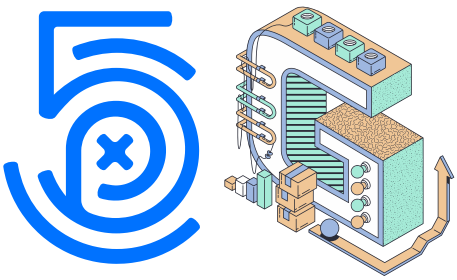
"This is an incredibly exciting time for VR as 5G performance advantages begin to further liberate the scaling potential of immersive tech and real-time learning & collaboration experiences across education and the corporate world."
Nigel Newby-Housel, Vice President of HTC Operator Solutions

REFLECTION

As we can see, 5G is becoming the main choice of networking due to its high performance. This, in turn, accelerates the development of XR technologies as the quality of data streaming is advanced enough for more sophisticated functions and capabilities.

As a result, XR begins jumping out of the "gaming entertainment exclusive" stereotype and started to be accepted by the workplace in the form of simulating environments and eventually extend across the education sector to our campuses.

Now, as the 5G rollout become more and more affordable and education sectors began testing their own XR teaching methods, it seems that the education of the future will no longer be solely depending on papers and books and will put interactive electronic learning as its basis with a emphasis on full-on immersion and the concept of "fun" learning. Perhaps one day, the campuses of the future is going to be full VR mode, with only "holograms of text, pictures and other features instead of physical books?



Source:https://www.t-mobile.com/news/business/fisk-university-htc-vive-t-mobile-and-victoryxr-launch-5g-powered-vr-human-cadaver-lab

INDUSTRY TALK 5
SMART CAMPUS

A TALK BY GOH BIH DER
BY: MUHAMAD AMSYAR BIN IBRAHIM
AND
WAN AHMAD FARIS BIN WAN ASMADI

IMPACT OF PANDEMIC

With the rise of Covid-19 in the end of 2019,it has impacted many companies and organizations. One of the impacts of this pandemic is employees are forced to work from home. Other than that, the acceleration of Digital transformation.

Thirdly, business are forced to switch into online business. Fourthly, leveraging public cloud infrastructure and last but not least, remote management of IT infrastructure.

POST-PANDEMIC

There has been a lot of changes since Covid-19 strikes the world. Companies are pressured to improve their performance in order to survive in this post-pandemic. The changes that company made is improved guest services with the use of robot, better security due to the rise of hacking cases around the world and lower the utility costs due to the economy crisis around the world.

Other than that, many companies deployed billions of IoT devices every months in order to help with this issues.

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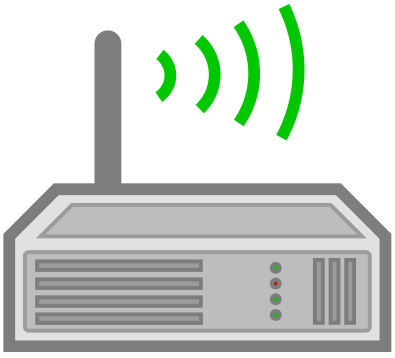
TRANSFORMING WIRELESS COMMUNICATION

In the early 90's, first ever smartphone was invented by IBM switching from wired to wireless communication. This evolution let us to communicate no matter where we are.



WIFI 6 SOLVES REAL PROBLEM

Problems regarding to technologies or specifically WiFi could also be easily solved with WiFi 6 recently. Firstly, Wifi 6 has increased the efficiency of transmitting data of WiFi to another devices. Hence, it could speed up in terms of downloading or uploading data in a wireless way Next, WiFi 6 has improved the communication between the access point of WiFi and the devices. For now the access point can easily access to multiple devices because of the existence of WiFi 6. Moreover, the power efficiencies has also increased allowing the devices to have a better battery life. Other than that, WiFi 6 is completed with 1024-QAM enabling to carry 10-bits rather than 8 -bits which could represents more characters. It also has added the 25% of data rate for Wifi access point and devices.

SMART CAMPUS

Smart campus is the combination of smart city and smart home which utilizes IoT devices in campus or university to create new experiences and improve services for students and staff in the campus.

There is 3 benefits of implementing the smart campus which is smart living, smart learning and smart safety.

Smart living in smart campus is aimed to make student's life more productive and efficient. The example of smart living is smart ID cards for students, smart lighting, personal networks, wayfinding and smart parking.

Smart learning is the use of advance technologies for learners to learn effectively, conveniently and efficiently. The example of smart learning is flexible learning spaces, digital portals, virtual labs and library of the future.

Smart safety is the use of IoT devices in order to protect students from any harm and protect any confidential document inside the campus. The example of smart safety is CCTV & VMS, smart lock, motion detection and sound detection and many more.

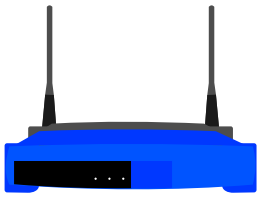
With all the benefits of smart campus, it will bring and create a greater experience for students and staffs.

BENEFITS OF DEPLOYING IoT

There is a lot of advantages of using IoT in everyday life. One of the benefits is that it can reduce the cost of employing workers. Other than that, it can increase the customer experience thus attracting more customer. It also increase the business opportunities. Lastly, it will increase the efficiency and productivity of a company.

EVOLUTION OF THE NETWORK

Network has experienced many evolution. Firstly in 1970, they started with Local Area Network or LAN which the group of computers and network devices are connected within the same building only. Later on in 1990, they had an improvement where they created Wide Area Network or WAN allowing computers and network communicate in a large geographical area. However, currently we are using the IoT devices that are embedded with sensors, processing ability, software, and other technologies that connect and exchange data with other devices and systems over the Internet or other communications networks.

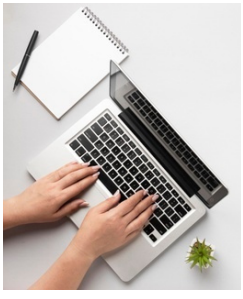


CHALLENGES OF DEPLOYING IoT

When there is advantages, there will always be challenges that prevent it from happening. One of the challenges in deploying IoT is connectivity. This is because not everyone can use IoT. Secondly, security. People with hacking skills can acquire confidential information about yourself and company by hacking the devices. Lastly, the compatibility of the devices. With many companies that produce IoT devices, every IoT devices have different kind of programs for it to run smoothly without any problem.

REFLECTION

I gained many useful information about smart campus from this talk. Smart campus has brought many new experiences for the students and staffs in the campus. As an example, one of the smart campus features that has been implemented in Universiti Teknologi Malaysia is lecture capture. Once covid-19 strikes the world, students are forced to stay and study from home due to closure of school. With lecture capture, students do not have to worry about missing classes. Students can easily access the recording through their PC's or mobile phones and watch the recording at any time they want. With that, students can get more understanding about the topic of the recording.



What is it Emerging Technology on Network Infrastructure ?

During Pandemic and Social distance, many of US started to rely on our Networks to do our daily tasks from Finishing our tasks remotely to Play games with friends. Because of this ISPs pressured to improve its Network Structure to be able handle this massive Traffic

That's Why we started to hear About New Technologies in Network World

Technology in Pandemic

In last 24 months Technology, played Vital role in preventing Contacting between people, helped governments and doctors in researches in Vaccine and etc

Because of Rapid innovation and implementation of technology it allowed us to navigate the challenges from this deadly threat to safely care for our patients

Technology after Pandemic

During Pandemic Networks Was one of ways that we used to contact each other, Share info to educate people about threats and do out tasks remotely

This have made a pressure on ISPs to improve their Network Infrastructure to improve speed bandwidth

Also, the pressure wasn't on network only, it was also on security, improve authentication, authorization and account systems and so on

Increasing Needs for AI

AI was just a Field to study and Work in. it was one technologies helped in Pandemic as it was used in café to serve people to prevent spreading of COVID-19

AI Value increased and it was used in many fields not just its Field

WIFI and Access Points

WAP are specialized communication devices in a network that receive and transmit data and signals. They plug into a network switch, hub or a wired router and transmit wireless signals within a local area network (LAN). These signals allow wireless-capable devices such as computers or printers to connect to a wired network, in a wireless fashion

WIFI is term used on Device that we call it today is Router which is small device that has Network Parts like Router, Access Point, Modem and so on All in one to help us connect to internet

Increasing Needs for AI

we saw during the pandemic, AI helped researchers develop COVID-19 treatments and vaccinations at speeds previously unheard of. ... It's also helping to improve outcomes for strokes and other diseases that place an immense burden on the healthcare system

AI allows organizations to make better decisions, improving core business processes by increasing both the speed and accuracy of strategic decision-making processes

WIFI 5

5G is the 5th generation mobile network. It is a new global wireless standard after 1G, 2G, 3G, and 4G networks. 5G enables a new kind of network that is designed to connect virtually everyone and everything together including machines, objects, and devices.

WIFI 6

6G (sixth-generation wireless) is the successor to 5G cellular technology. 6G networks will be able to use higher frequencies than 5G networks and provide substantially higher capacity and much lower latency. One of the goals of 6G internet will be to support one microsecond-latency communication. This is 1,000 times faster -- or 1/1000th the latency -- than one millisecond throughput

Global Economy of WIFI 6

The Wi-Fi Alliance published a recent report that 2021 will see the current annual global economic value of Wi-Fi will reach $3.3 trillion. The report further suggests that Wi-Fi value will climb to $4.9 trillion by 2025. If correct, these forecasts represent a 150% growth in the technology's value from 2018 to 2025

How WIFI 6 Beat WIFI 5

Speed and Range

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Smart Home

WiFi 6 has been designed to be able to handle an increase in devices without negatively impacting your WiFi speeds. This results in a smooth streaming experience, while providing uninterrupted connectivity of lights, switches, thermostats and any other IOT device you may add to your smart home.